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SOUTHEASTERN FOREST EXPERIMENT STATION

Technical Note No. 64

Asheville, N. C.
July 15, 1946X LOGGING AND MILLING STUDIES IN THE SOUTHERN APPALACHIAN REGION
PART III.--LUMBER VALUE YIELDS

By

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The purpose of a logging and milling time-cost study is to find, through a comparison of production costs and lumber value yields, the margins available for stumpage and profit or loss by log and tree sizes.

This note, which is the third in a series of four technical notes describing time-cost studies in the Southern Appalachians, is concerned only with the calculation of lumber value yields. For the latter purpose, analyses were made of lumber grade-yields of logs and trees, lumber thicknesses, and overrun or underrun; and these data were related to ceiling lumber prices.

Eighteen hardwood species from two areas near Asheville, North Carolina, were studied. Ash, chestnut, black gum, hickory, red maple, black oak, chestnut oak, northern red oak, scarlet oak, white oak, and yellow-poplar came predominantly from the Bent Creek Experimental Forest, 16 miles from Asheville.^{1/} Basswood, beech, black birch, buckeye, black cherry, cucumber magnolia, and sugar maple came almost

^{1/}Nearly the whole cutting area was included within various oak types. Elevations ranged from 2800 to 3750 feet; slopes varied up to 100 percent, but averaged 30 percent. Sawtimber volume per acre of operable area averaged 5.1 M bd. ft. before cutting. By using 18 inches as a rough diameter cutting limit, 74 percent of the total merchantable volume was removed.

exclusively from the Big Ivy Working Circle of the Pisgah National Forest, 24 miles from Asheville.^{2/}

Logs were taken to a stationary circular mill sawing about 10 M bd. ft. of lumber per day, where at least an average effort was made to obtain higher grades of lumber, overrun, and thicker dimensions. The mill was a No. 7 Wheeland with a gang edger (3 saws), a trimmer (2 saws), a swing cut-off saw, and a small skidder for hauling logs from the yard to the deck. The power unit was a new Murphy Diesel engine of 150 h.p.^{3/}

Lumber grade-yields, thicknesses, and overrun or underrun were recorded for 1,225 hardwood logs. The sample of eighteen species was distributed as follows: ash, 5 logs; basswood, 128; beech, 11; black birch, 46; buckeye, 17; black cherry, 4; cucumber magnolia, 31; chestnut, 49; black gum, 32; hickory, 36; red maple, 74; sugar maple, 201; black oak, 51; chestnut oak, 180; northern red oak, 90; scarlet oak, 69; white oak, 95; and yellow-poplar, 106.

All parts of the milling study, i.e., lumber grade-yields, thicknesses, overrun or underrun, and lumber value yields, were related to log grades and to trees composed of logs of specified grades. The log grading rules used are shown in table 1.

The reconstruction of data for different log sizes into data for different tree sizes was accomplished through the use of tree-log relationships determined on the Bent Creek Experimental Forest. These relationships were also used for species from the Big Ivy Working Circle, but although some error may have been introduced thereby, it is probably not serious.

^{2/} The Big Ivy cutting area was predominantly of cove hardwood types, but contained large proportions of oak-chestnut and northern hardwood types. Elevations and slopes were similar to those encountered on the Bent Creek Experimental Forest. Sawtimber volume per acre of operable area was 9.7 M bd. ft., of which 6.6 M bd. ft. was marked for cutting.

^{3/} The crew required to operate the mill numbered seven men -- a sawyer, dog setter edgerman, trimmerman, cut-off sawyer, lumber sorter, and log yardman. Two other men were required to pile lumber in the yard.

Table 1.--Hardwood Log Grading Rules

Log Grade	Minimum Diameter	Minimum Length	Maximum Defect		Minimum Surface Requirements on Each of 3 Visible Faces
			Permitted Including Sweep, Rot, Shakes, etc.	(Feet) (Percent)	
Select	16	10	10	10	Clear.
	24	10	10	10	3/4 clear in one clear-cutting.
1	14	10	10	25	5/6 clear in one clear-cutting.
	16	10	10	25	5/6 clear in not over 2 clear-cuttings, each not less than 5 feet long.
2	12	10	10	35	2/3 clear in not over 2 clear-cuttings, each not less than 3 feet long.
	16	10	10	40	2/3 clear in not over 3 clear-cuttings, each not less than 3 feet long.
3	10	10	10	50	No surface requirements.

Lumber Grade-Yield

Table 2 shows the percentage of lumber occurring in each lumber grade from sawed logs of various diameters, species, and log grades. Lumber was graded by standard hardwood grading rules.^{4/} For each species, the attempt was made to separate all log grades -- Select, 1, 2, and 3. However, samples were too small in some cases to warrant log grade divisions, as in the case of ash and beech. For most species, too, it was found advisable to combine Select and No. 1 logs. This was a consequence of the scarcity of Select logs. It is not a reflection of lack of utility in maintaining a separate grade of logs which is superior to the No. 1 grade. Chestnut log grades were not differentiated because substantial differences in their lumber yields could not be discerned.

The method used was to construct grade-yield curves over log diameter for species with large log samples. These large samples provided a general pattern which was used to guide the curves for other species. In this manner, an accuracy could be imparted to small samples which far exceeded the accuracy exhibited when the samples were isolated from the main pattern.

Table 3 is similar to table 2 except that the grade-yield percentages apply to tree diameter classes rather than log diameter classes. In constructing table 3, an effort was made to segregate log grades wherever possible. Thus, in the category "Red Maple - Grade 2 Logs," grade-yields were determined on the supposition that all logs cut were No. 2 logs, but that the size and number of logs used in the calculation of grade-yield were those actually determined from the tree-log relationships measured on the Bent Creek Experimental Forest. The interpretation of table 3 is exemplified by the following illustration of a red maple tree 24 inches in diameter at breast height containing only No. 2 logs -- such a tree is likely to yield 5 percent F and S lumber, 7 percent Select lumber, 34 percent No. 1 Common, 33 percent No. 2 Common, 16 percent No. 3A Common, and 5 percent No. 3B Common.

^{4/}An experienced lumber grader was furnished by the sawmill owner for the grade-yield study.

Table 2.--Percentage of lumber in different lumber grades by species, log grade, and log diameter class

Log Diameter Class	Ash			Basswood			Select & Grade 1 Logs			Basswood			Grade 2 Logs			Grade 3 Logs				
	F&S	Sel.	1C	2C	3C	F&S	Sel.	1C	2C	3AC	F&S	Sel.	1C	2C	3AC	F&S	Sel.	1C	2C	3AC
10	44	41	15				20	37	19	11	5	8	30	42	15	14	59	26	1	
12	5	40	40	15			13	20	39	17	9	10	26	42	13	21	25	17	5	
14	5	37	40	14			18	20	39	17	6	9	12	24	42	13	28	53	10	
16	6	34	40	14			20	21	39	17	3	9	12	24	42	12	31	52	8	
18	10	32	40	14			21	21	39	16	3	9	12	24	42	9	32	51	7	
20	12	29	40	14			21	21	39	16	3	9	12	24	42	9	34	50	6	
22	14	28	39	14			22	21	39	15	3	9	13	24	42	9	35	50	6	
24	15	27	39	14			23	22	38	14	3	10	13	24	42	8	36	49	6	
26	16	27	39	13			22	22	37	13	3	11	13	24	42	7	33	48	7	
28	17	27	39	11			22	22	37	12	3	11	14	24	42	6	37	48	7	

<u>Log</u>	<u>Beech</u>	<u>Black Birch</u>	<u>Bl Birch-Gr J Logs</u>	<u>Collected</u>	<u>Bucketey</u>
Amber 2 1000					

Table 2 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and log diameter class

Log Diameter Class	Buckeye						Black Cherry						Chestnut-All Log Grades						Cucumber Grade 1 Logs								
	Grade 2 Logs			Grade 2 Logs			Sel. 1C 2C 3AC 3BC			Sel. 1C 2C 3AC 3BC			2C 3AC 3BC			Sound Wormy			FAS Sel. 1C 2C 3AC 3BC			FAS Sel. 1C 2C 3AC 3BC					
	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC			
10																											
12	27	53	19	1	2	20	47	17	16	12	19	2	14	53	41	6	9	49	37	5	53	41	6	9			
14	27	53	15	2	2	20	47	16	15	20	18	2	15	48	49	45	5	10	45	35	5	53	41	6	9		
16	28	53	12	3	2	20	47	16	15	22	17	2	16	44	49	42	5	9	10	42	34	5	10	45	35	5	
18	28	54	11	3	3	20	47	16	14	26	17	2	19	36	5	11	42	34	4	11	42	34	4	12	42	33	3
20	29	54	9	3	3	20	47	16	14	28	17	2	21	32	9	11	42	34	4	12	42	33	3	1	42	32	2
22	30	54	8	3	3	20	47	16	14	30	17	2	22	29	9	13	42	32	2	13	42	32	2	1	42	32	2
24	31	54	7	3	4	20	47	16	13	32	17	2	24	25	9	13	42	32	2	13	42	32	2	1	42	32	2
26	32	53	7	3	4	20	47	16	13	34	17	2	25	22	9	13	42	32	2	13	42	32	2	1	42	32	2
28	33	53	6	3	4	21	47	16	12	36	17	2	26	19	9	13	42	32	2	13	42	32	2	1	42	32	2
30																											
32																											
34																											
36																											
38																											

Log Diameter Class	Cucumber						Black Gum						Black Gum						Bl Gum-Gr 2 Logs						Bl Gum-Grade 3 Logs					
	Grade 2 Logs			Grade 3 Logs			Sel. 1C 2C 3AC 3BC			Sel. 1C 2C 3AC			1C 2C 3AC			1C 2C 3AC			1C 2C 3AC			1C 2C 3AC			1C 2C 3AC					
	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC			
10																														
12	32	52	9	7	7	64	24	5	43	43	14	30	48	22	15	54	20	10	1	1	1	1	1	1	1	1	1	1		
14	33	52	9	6	10	62	21	7	48	39	13	31	48	21	21	50	18	7	4	4	4	4	4	4	4	4	4	4		
16	33	52	9	6	12	60	20	8	52	37	11	32	48	16	4	23	51	14	6	6	6	6	6	6	6	6	6	6		
18	33	52	9	6	12	61	19	8	2	53	10	33	47	13	7	23	52	17	4	3	3	3	3	3	3	3	3	3		
20	34	52	9	5	12	62	18	8	7	49	35	9	34	47	13	6	23	55	11	3	3	3	3	3	3	3	3	3		
22	34	53	9	4	12	63	17	8	10	47	35	8	35	47	12	6	23	57	11	2	2	2	2	2	2	2	2	2		
24	34	53	9	4	12	64	17	7	12	65	17	6	12	46	35	7	23	59	10	2	2	2	2	2	2	2	2	2		
26	34	54	8	4	12	65	17	6	12	65	17	6	12	46	35	7	23	60	10	2	2	2	2	2	2	2	2	2		

Table 2 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and log diameter class

Log Diameter Class	Hickory-Grade 2 Logs				Hickory - Grade 3 Logs				Red Maple Select & Grade 1 Logs				Red Maple Grade 2 Logs							
									F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC
	1C	2C	3AC	3BC	1C	2C	3AC	3BC	Tim- bers											
10	57	4	4	35	5	8	49	19	19	4	36	36	24							
12	53	4	4	37	11	9	46	19	15	2	5	35	22	1						
14	48	5	3	30	4	4	39	17	9	44	18	12	4	7	34	34	19	19	3	
16	32	5	4	34	6	48	3	4	39	17	9	44	18	12	4	7	34	33	17	
18	34	5	4	38	7	47	3	3	40	17	9	44	17	9	5	7	34	33	14	
20	41	8	45	3	41	3	3	41	21	9	44	17	9	5	7	34	33	14	7	
22	45	9	42	2	45	9	42	2	3	44	24	9	43	17	7	6	7	34	33	
24	50	10	40	2	50	10	40	2	2	46	25	10	42	17	6	7	7	34	34	
26	52	11	39	2	52	11	39	2	2	46	26	9	43	16	6	8	7	34	34	
28	54	12	39	2	54	12	39	2	2	45	27	9	44	16	4	9	7	34	34	
30	54	12	39	2	54	12	39	2	2	45	28	9	44	16	3	10	7	34	35	
32										29	9	44	16	2	12	6	34	36	7	

Log Diameter Class	Red Maple Grade 3 Logs				Sugar Maple Select & Grade 1 Logs				Sugar Maple Grade 2 Logs				Sugar Maple Grade 3 Logs							
									F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC
	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC			
10	12	62	26	3	26	11	35	16	12	1	6	3	7	38	29	22	9	18	45	
12	14	59	24	3	27	12	35	15	10	1	9	9	9	39	27	17	7	26	43	
14	14	57	23	5	29	13	34	14	8	2	10	10	10	40	27	14	5	1	2	
16	14	56	21	6	30	14	34	13	7	2	11	11	11	40	27	12	3	28	42	
18	15	54	22	6	31	14	34	12	7	2	11	10	10	41	27	9	3	30	41	
20	15	54	23	5	32	14	34	11	7	2	12	10	10	41	28	8	4	31	40	
22	15	53	23	5	33	15	33	10	8	1	13	10	10	41	28	6	4	32	39	
24	16	52	22	5	34	14	34	11	7	2	13	10	10	41	29	6	5	33	38	
26	16	52	22	4	33	15	33	10	8	1	14	10	10	42	30	3	6	33	39	
28	16	51	22	4	34	15	33	8	10	1	14	10	10	42	30	1	7	33	39	
30	16	51	23	2	16	16	51	22	4	1	12	10	10	41	29	6	1	38	45	
32	9	16	50	24	1						12	6	34	36	7	5			15	

Table 2 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and log diameter class

Log Diameter Class	Black Oak-Sel. & Grade 1 Logs					Black Oak - Grade 2 Logs					Black Oak - Grade 3 Logs									
	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	Timbers	
10													3	25	34	29	9			
12													10	27	29	23	11			
14													11	28	25	25	11			
16													11	28	22	25	10			
18													2	12	28	22	25			
20													2	2	13	29	20	25	9	
22													3	14	30	18	25	8		
24													3	15	30	17	26	7		
26													3	16	30	15	27	7		
28													3	17	30	15	27	5		
30													3	18	30	14	27	5		
32													4							
Log Diameter Class	Chestnut Oak - Select Logs					Chestnut Oak - Grade 1 Logs					Chestnut Oak - Grade 2 Logs					Chestnut Oak - Grade 3 Logs				
	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	Timbers	
12													12	21	15	16	22			
14													12	22	15	16	21	14		
16													1	12	22	15	16	21	13	
18													2	13	22	15	14	21	13	
20													2	15	23	15	12	21	12	
22													2	17	23	15	10	21	12	
24													3	18	23	15	9	21	11	
26													3	19	23	15	8	21	11	
28													3	20	24	15	6	21	11	
30													3	20	24	15	6	21		
32													3	20	24	15	6	21		

Table 2 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and log diameter.

Log Diameter Class	Chestnut Oak - Grade 3 Logs						N. Red Oak - Select Logs						N. Red Oak - Grade 1 Logs					
	F&S	Sel.	1C	2C	3AC	3BC	Sound	Tim- bers	Wormy	F&S	Sel.	1C	2C	3AC	3BC	Sound	Tim- bers	Wormy
10	1	19	18	18	19	25				14	10	39	12	10	7	8		
12	2	19	18	18	20	23				17	10	36	12	11	7	7		
14	4	18	17	19	20	22				21	9	34	12	11	6	6		
16	6	18	17	19	20	20				24	9	31	12	11	6	6		
18	6	19	17	18	21	18				27	9	29	12	11	6	6		
20	6	19	17	18	21	17				30	9	27	11	11	6	6		
22	2	6	19	17	18	21				33	9	24	11	11	6	6		
24	3	8	19	17	18	21				36	9	22	11	11	6	5		
26	3	9	19	17	18	21				39	9	20	11	10	6	5		
28	3	9	19	17	18	21				41	9	19	10	10	6	5		
30										43	9	18	10	9	6	5		
32										44	10	17	11	7	6	5		
34										45	10	17	11	6	6	5		
36										46	10	17	11	6	6	5		
38										47	11	19	10	6	5	5		
40										48	11	18	10	5	4	4		
Log Diameter Class	N. Red Oak - Grade 2 Logs						N. Red Oak - Grade 3 Logs						Scarlet Oak - Grade 2 Logs					
	F&S	Sel.	1C	2C	3AC	3BC	Sound	Tim- bers	Wormy	F&S	Sel.	1C	2C	3AC	3BC	Sound	Tim- bers	Wormy
10										22	5	6	7	28				
12										22	5	5	7	27				
14	4	37	23	16	10	11	1	1	1	23	32	6	6	26	9	29	3	5
16	7	35	23	15	9	11	2	1	1	24	33	5	6	25	5	30	2	20
18	10	34	22	15	9	10	2	1	1	24	33	5	6	24	8	31	2	14
20	13	33	22	14	8	10	3	1	1	24	33	5	6	23	10	33	2	11
22	13	33	20	14	8	9	3	1	1	24	34	5	6	22	11	34	2	11
24	15	4	31	20	14	7	4	1	1	25	34	4	5	21	12	34	2	11
26	17	4	31	20	13	7	4	1	1	26	34	4	5	20	13	34	2	10
28	19	4	31	19	13	6	5	1	1	26	35	3	5	19	14	34	2	9
30	20	4	31	19	12	6	6	1	1	26	35	3	5	18				
32	21	5	31	18	11	6	6	1	1	26	35	3	5	17				
34	23	5	31	17	10	7	7	1	1	26	35	3	5	16				

Table 2 (continued).--Percentage of lumber in different lumber grades by species, log grade, and log diameter class

Log Diameter Class	Scarlet Oak - Grade 3 Logs					Wh. Oak-Sel. & Grade 1 Logs					White Oak - Grade 2 Logs								
	F&S Sel.	1C	2C	3AC	3BC	Sound	Timber	F&S Sel.	1C	2C	3AC	3BC	Sound	F&S Sel.	1C	2C	3AC	3BC	Timber
10	7	39	23	29	2	2		4	13	31	19	9	20	4	21	27	10	4	38
12	8	39	25	24	2			8	11	32	17	9	15	8	29	26	8	4	27
14	2	8	38	27	18	3	4	12	10	32	16	8	12	10	2	33	24	7	5
16	16	1	9	38	28	17	3	4	16	9	32	14	8	10	11	4	34	23	6
18	20	1	9	38	28	18	3	3	19	8	32	13	8	8	12	3	35	22	6
20	22	2	10	38	28	18	2	2	22	7	32	12	7	7	13	5	36	20	6
24	24	2	10	38	28	18	2	2	24	6	32	11	7	7	13	5	37	20	6
26	28								26	6	30	11	7	7	13	6	37	20	5
30	30								28	5	29	11	7	7	13	7	38	18	5
32									30	5	28	9	8	7	13	8	39	18	4

Log Diameter Class	White Oak - Grade 3 Logs					Yellow-poplar Select Logs					Yellow-poplar Grade 1 Logs								
	F&S	F&S Sel.	1C	2C	3AC	3BC	Sound	Wormy	F&S	F&S Sel.	1C	2C	3AC	3BC	F&S	1C	2C	3AC	3BC
10	21	20	26	15	18				16	17	34	23	10	10	3	20	44	26	7
12	3	24	18	25	15	15			16	16	17	34	23	9	4	20	44	26	7
14	8	23	17	23	15	14			16	16	17	34	23	9	4	20	44	24	7
16	11	23	16	23	14	13			17	17	17	34	23	9	5	21	44	23	6
18	1	13	22	16	22	14			17	17	17	34	23	9	5	22	44	22	6
20	1	14	21	16	22	14			18	18	18	34	22	9	5	22	45	22	5
22	2	14	20	16	22	14			18	18	18	34	22	9	5	22	45	22	5
24	2	1	15	19	16	22			19	19	19	34	22	8	5	22	45	22	5
26	2	1	16	18	15	23			20	20	20	34	21	8	6	23	45	20	4
28	2	1	16	18	15	23			21	21	21	34	20	7	6	23	45	20	4
30	2	1	18	15	15	24			22	22	22	34	20	6	6	24	45	20	3
32																			
34																			
36																			
38																			
40																			
42																			
44																			

Table 2 (Continued) .--Percentage of lumber in different lumber grades by species, log grade and log diameter class

Log Diameter Class	Yellow-poplar						Yellow-poplar					
	Grade 2 Logs			Grade 3 Logs			Grade 2 Logs			Grade 3 Logs		
	F&S	Sap	1C	2C	3AC	3BC	Sap	1C	2C	3AC	3BC	
10							13	65	12	10		
12							14	64	12	10		
14							14	64	12	10		
16							15	64	11	10		
18	1	2	31	57	10		2	13	64	11	10	
20	2	2	33	55	10		3	13	64	11	9	
22	1	2	33	54	10		3	13	64	11	9	
24	1	2	35	52	10		4	13	63	11	9	
26	1	2	36	51	9		4	13	63	11	9	
28	2	2	36	50	9		5	13	63	11	8	
30	2	2	37	49	9		5	13	64	10	8	
32	3	2	38	47	9		6	13	65	9	7	
34	3	2	39	46	8							
36	3	2	40	45	8	2						

Table 3.-Percentage of lumber in different lumber grades by species, log grade, and tree diameter class

Tree DBH Class	Ash				Basswood						Basswood						Basswood						
	All Log Grades				Select & Grade 1 Logs			Grade 2 Logs			F&S Sel. 1C 2C 3AC 3BC			F&S Sel. 1C 2C 3AC 3BC			F&S Sel. 1C 2C 3AC 3BC			F&S Sel. 1C 2C 3AC 3BC			
	F&S	Sel.	1C	2C	3C	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC
14	4	41	40	15								7	9	28	42	14		1	19	57	19	4	
16	2	4	39	40	15							8	10	26	42	14		1	1	21	56	17	4
18	4	5	37	40	14	16	20	38	18	8		9	11	25	42	13		1	1	24	55	14	5
20	6	5	35	40	14	17	20	39	18	6		9	12	25	41	12	1	2	1	26	54	12	5
22	8	5	33	40	14	18	21	39	17	5		10	12	25	40	11	2	3	1	29	53	9	5
24	10	5	31	40	14	19	21	39	17	4		11	12	25	40	10	2	3	1	31	52	8	5
26	12	5	29	40	14	20	21	39	17	3		12	13	24	40	9	2	3	1	32	51	8	5
28	14	5	27	40	14	21	21	39	17	2		13	14	24	39	7	3	2	3	33	50	7	5
30	15	5	28	39	13	22	21	39	16	2		13	14	24	39	7	3	3	2	34	50	6	5
32	16	5	28	39	12	23	21	39	15	1		14	15	24	38	5	4	3	2	35	50	5	5

Tree DBH Class	Beech				Black Birch						Bl. Birch-Grade 3 Logs						Buckeyes						
	Grade 3 Logs				Grade 2 Logs			F&S Sel. 1C 2C 3AC 3BC			F&S Sel. 1C 2C 3AC 3BC			F&S Sel. 1C 2C 3AC 3BC			F&S Sel. 1C 2C 3AC 3BC			F&S Sel. 1C 2C 3AC 3BC			
	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC
14	28	33	27	12	1	3	41	24	21	10	9		17	43	34	8		9	4	38	31	14	4
16	30	33	25	12	3	4	40	24	20	9		18	41	29	10		12	4	37	30	13	4	
18	1	31	33	24	11	4	39	25	19	9		19	40	28	13		16	4	36	29	11	4	
20	2	31	33	24	9	5	38	25	18	9		21	39	27	13		21	4	35	27	9	4	
22	3	31	32	23	8	6	38	25	17	9		22	38	26	14		23	4	34	26	9	4	
24	5	31	32	21	8	7	38	25	17	8		24	37	25	14		25	4	34	25	9	4	
26	7	30	32	19	8	6	38	25	17	6		25	37	24	14		27	4	33	25	8	3	
28	9	4	30	32	19	6	6	38	25	17							29	4	33	24	7	3	
30	10	4	29	32	19	6																	
32																							

Table 3 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and tree diameter class

Tree DBH Class	Buckeye			Black Cherry			Chestnut-All Log Grades			Cucumber					
	Grade 2 Logs			Grade 2 Logs			Sound Timbers			Grade 1 Logs					
	Sel.	1C	2C	3AC	3BC	Sel.	1C	2C	3AC	3BC	F&S Sel.	1C	2C	3AC	3BC
14	1	27	53	17	2	1	20	47	17	15	16	17	2	15	50
16	2	27	53	15	3	2	20	47	16	15	17	18	2	16	48
18	3	28	53	13	3	3	20	47	16	14	20	18	2	17	46
20	4	28	53	12	3	4	20	47	16	13	22	18	2	18	40
22	5	28	54	10	3	4	20	47	16	13	24	18	2	19	37
24	5	28	54	9	3	4	21	47	16	12	26	18	2	20	34
26	5	29	54	8	3	4	22	47	16	11	28	17	2	21	32
28	5	30	54	8	3	4	22	47	16	11	30	17	2	22	29
30	5	31	54	7	3	4	23	47	16	11	33	17	2	22	26
32	5	32	54	6	3	4	23	47	16	10	34	17	2	22	25
34											35	16	2	23	24
36											36	16	2	23	23
38											37	14	2	25	22
40											38	12	2	27	21
42															

Tree DBH Class	Cucumber			Grade 3 Logs			Grade 1 Logs			Blk Gum			Blk Gum-Gr. 2 Logs			Blk Gum-Gr. 3 Logs				
	Grade 2 Logs			Sel. 1C 2C 3AC 3BC			Sel. 1C 2C 3AC			Sel. 1C 2C 3AC			Sel. 1C 2C 3AC			Sel. 1C 2C 3AC				
	Sel.	1C	2C	3AC	3BC	Sel.	1C	2C	3AC	3BC	Sel.	1C	2C	3AC	3BC	Sel.	1C	2C	3AC	3BC
14																				
16	52	52	9	7	5	65	26	4			31	48	20	1		13	55	21	10	1
18	52	52	9	6	9	64	24	5			31	48	19	2		16	53	20	9	2
20	52	52	9	6	10	62	23	6			32	48	17	3		19	52	18	7	4
22	52	52	9	6	11	61	22	7			32	48	15	5		21	52	16	6	5
24	52	52	9	5	11	60	21	8			33	48	14	5		22	52	14	5	7
26	52	53	9	4	12	60	21	7			34	48	13	5		22	53	13	4	8
28	54	54	9	3	12	61	20	7			35	47	13	5		23	55	10	4	7
30	55	55	9	2	13	62	18	7			36	47	11	6		24	57	9	3	7

Table 3 (Continued).--Percentage of lumber in different lumber grades by species, log grade and tree diameter class

Tree DBH Class	Hickory-Grade 2 Logs						Hickory-Grade 3 Logs						Red Maple Select & Grade 1 Logs						Red Maple Grade 2 Logs						
	Sel.			Tinbers			Sel.			Timbers			Sel.			Tinbers			Sel.			Tinbers			
	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	
14	16	16	45	3	3	31	1	54	4	4	37	17	9	44	18	12	10	9	44	17	17	10	9	44	23
15	18	17	42	5	5	33	3	51	4	4	39	20	9	44	18	12	10	9	43	17	17	10	9	44	22
16	20	17	40	4	4	36	5	50	4	4	39	22	9	43	17	7	6	7	34	13	13	12	6	34	20
17	22	18	40	4	4	36	6	47	5	5	41	24	9	43	17	7	6	7	34	13	13	12	5	34	16
18	24	19	39	4	2	36	7	44	5	5	43	25	9	43	17	6	6	7	34	13	13	12	5	34	15
19	26	19	35	3	2	41	8	40	3	3	46	26	9	43	17	5	5	7	34	13	13	12	5	34	15
20	28	20	31	2	2	41	9	39	2	2	48	27	9	43	17	4	4	7	34	13	13	12	5	34	15
21	30	20	30	3	3	36	10	36	2	2	50	28	9	43	17	3	3	7	34	13	13	12	5	34	15
22	32	20	29	2	2	36	11	35	2	2	50	29	9	43	17	2	2	7	33	13	13	12	5	33	15
23	34	20	29	1	1	43	12	34	1	1	48	30	10	44	16	1	1	7	33	13	13	12	5	33	15
24	36	24	34	1	1	43	13	34	1	1	48	31	10	44	16	1	1	7	33	13	13	12	5	33	15

Tree DBH Class	Red Maple Grade 3 Logs						Red Maple Select & Grade 1 Logs						Sugar Maple Grade 2 Logs						Sugar Maple Grade 3 Logs					
	Sel.			Tinbers			Sel.			Timbers			Sel.			Tinbers			Sel.			Tinbers		
	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC	1C	2C	3AC
14	14	13	60	25	2	2	27	12	35	15	11	11	1	5	36	28	19	9	19	7	5	36	28	1
15	16	14	59	25	2	2	28	12	35	15	9	11	1	7	38	27	16	5	27	15	7	38	28	3
16	16	14	58	25	2	2	29	12	35	14	9	11	1	7	38	27	15	4	27	13	7	38	28	5
17	18	14	57	25	2	2	30	13	34	14	8	10	2	8	39	27	15	4	27	13	7	38	28	6
18	20	14	57	25	2	2	31	13	34	13	7	12	2	8	40	27	15	4	27	13	7	38	28	6
19	22	14	56	25	2	2	32	13	34	13	6	12	2	8	40	27	15	4	27	13	7	38	28	6
20	24	14	56	25	2	2	33	13	34	13	5	12	2	8	40	27	15	4	27	13	7	38	28	6
21	26	14	55	25	2	2	34	13	34	13	4	12	2	8	40	27	15	4	27	13	7	38	28	6
22	28	14	55	25	2	2	35	13	34	13	3	12	2	8	40	27	15	4	27	13	7	38	28	6
23	30	14	55	25	2	2	36	13	34	13	2	12	2	8	40	27	15	4	27	13	7	38	28	6
24	32	14	54	25	2	2	37	13	34	13	1	12	2	8	40	27	15	4	27	13	7	38	28	6
25	34	14	53	25	2	2	38	13	34	13	0	12	2	8	40	27	15	4	27	13	7	38	28	6
26	36	14	52	25	2	2	39	13	34	13	-1	12	2	8	40	27	15	4	27	13	7	38	28	6

Table 3 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and tree diameter classes

Tree DBH Class	Bl. Oak-Select & Grade 1 Logs						Black Oak - Grade 2 Logs						Black Oak - Grade 3 Logs					
	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC	F&S	Sel.	1C	2C	3AC	3BC
14							1	20	30	18	27	2	2		8	28	30	23
16							1	21	29	18	24	3	4		10	28	26	23
18	4	7	33	24	22	8	2	1	2	20	29	17	21	4	1	11	29	26
20	5	6	33	23	22	8	3	1	2	20	29	17	19	4	6	1	12	30
22	7	6	34	22	21	6	4	1	2	19	28	17	17	3	8	1	2	30
24	10	6	35	21	19	5	4	2	3	19	28	16	17	3	11	1	2	13
26	12	6	35	20	18	5	4	3	3	19	28	16	17	3	11	2	2	15
28	13	6	36	19	17	5	4	3	3	19	28	16	16	3	11	2	2	16
30	15	6	37	18	16	4	4	4	3	19	28	15	16	3	11	3	2	17
32	16	6	38	17	14	4	5	3	3	19	28	14	16	4	11	3	2	17
34	17	5	39	17	12	4	6	3	3	19	28	14	16	4	11	3	2	18
36	18	5	40	17	10	4	6								2	18	32	15

Tree DBH Class	Chestnut Oak - Select Logs						Chestnut Oak - Grade 1 Logs						Chestnut Oak - Grade 2 Logs						
	F&S	Sel.	1C	2C	3AC	3BC	Sound	Tim-	F&S	Sel.	1C	2C	3AC	3BC	Sound	Tim-	F&S	Sel.	1C
16							2	18	13	10	13	31	13	13	1	12	22	15	
18	4	8	22	5	5	2	32	22	1	2	18	13	10	13	31	12	12	22	15
20	4	8	23	5	5	2	32	21	2	2	18	13	10	13	31	11	1	13	22
22	4	8	24	5	5	2	32	19	2	2	18	14	10	12	31	11	1	13	22
24	5	8	24	6	5	2	32	17	3	3	19	14	10	11	31	9	2	14	22
26	5	8	26	6	4	2	32	16	4	2	19	14	10	11	31	8	2	15	23
28	5	8	27	6	4	2	32	16	4	2	19	14	10	11	31	8	2	16	23
30	6	8	29	7	3	2	31	14	4	3	19	15	10	10	31	8	2	17	23
32	6	8	30	7	2	2	32	13	4	3	19	16	10	9	31	8	2	15	21
34	7	8	31	7	2	2	33	10	5	3	19	16	11	7	31	8	2	18	23
36	8	8	32	7	2	2	33	8	5	3	20	16	10	7	31	8	2	15	21

Table 3 (Continued).—Percentage of lumber in different lumber grades by species, log grade, and tree diameter class

Tree DBH Class	Chestnut Oak - Grade 3 Logs						N. Red Oak - Select Logs						N. Red Oak - Grade 1 Logs									
	F&S Sel.	1C	2C	3AC	3BC	Wormy	Timbers	F&S Sel.	1C	2C	3AC	3BC	Wormy	Timbers	F&S Sel.	1C	2C	3AC	3BC	Wormy	Timbers	
14	2	19	18	18	20	20	23								16	10	37	12	11	7	7	
16	3	19	18	18	20	22	22								18	9	36	12	11	6	7	
18	4	18	18	18	20	20	22								16	9	35	12	11	6	7	
20	5	19	17	18	20	21	21								16	9	35	12	11	6	7	
22	6	19	17	18	21	21	21								16	9	33	12	11	6	7	
24	2	6	19	17	18	21	21								16	9	32	12	11	6	7	
26	2	6	19	17	18	22	22								16	9	32	12	11	6	7	
28	2	6	19	17	18	23	23								16	9	30	12	11	6	7	
30	3	7	19	17	18	23	23								16	9	29	12	11	6	6	
32	3	7	19	17	18	24	24								16	9	27	12	11	6	6	
34															16	9	26	12	11	6	6	
36															16	9	25	11	11	6	6	
38															16	9	33	10	24	11	10	6
40															16	9	34	10	23	11	10	6
42															16	9	36	10	22	10	10	6
44															16	9	42	12	27	9	4	

Tree DBH Class	N. Red Oak - Grade 2 Logs						N. Red Oak - Grade 3 Logs						Scarlet Oak - Grade 2 Logs										
	F&S Sel.	1C	2C	3AC	3BC	Wormy	Timbers	F&S Sel.	1C	2C	3AC	3BC	Wormy	Timbers	F&S Sel.	1C	2C	3AC	3BC	Wormy	Timbers		
14	1	1	23	17	10	11	1	1	22	32	5	5	7	27	1	27	24	9	33	3	3		
16	1	1	37	23	17	10	1	1	23	32	5	5	7	26	2	29	25	10	27	3	4		
18	2	2	36	23	16	11	2	1	23	32	5	5	6	26	4	30	26	10	23	3	4		
20	3	3	35	23	15	10	1	2	23	32	5	4	6	26	6	30	26	11	19	3	5		
22	5	3	35	23	15	9	10	2	1	24	33	5	4	6	25	6	31	26	11	16	3	5	
24	6	3	35	23	15	8	10	1	1	24	33	5	4	6	24	6	32	26	11	14	3	5	
26	8	3	34	22	15	8	10	4	1	24	33	5	4	6	23	6	33	26	11	13	3	5	
28	10	3	34	21	14	8	10	4	1	24	33	4	5	6	23	6	34	26	11	11	3	5	
30	12	3	34	20	14	8	9	4	1	25	34	3	5	6	22	10	34	26	11	11	3	5	
32	13	3	34	20	13	8	9	5	1	25	34	2	5	6	22	11	35	25	11	10	3	5	
34	14	3	34	20	12	8	9	5	1	25	34	1	5	6	22	11	35	25	11	10	3	5	
36	15	4	34	19	11	8	9	5	1	26	34	1	5	6	22	11	35	25	11	10	3	5	
38.	16	4	34	19	10	8	9	5	1	26	34	1	5	6	22	11	35	25	11	10	3	5	

Table 3 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and tree diameter class

Tree DBH Class	Scarlet Oak-Grade 3 Logs						White Oak-Select & Gr. 1 Logs						White Oak - Grade 2 Logs											
	F&S	Sel.	1C	2C	3AC	3BC	Sound	Trim-	F&S	Sel.	1C	2C	3AC	3BC	Tim-	F&S	Sel.	1C	2C	3AC	3BC	Sound	Tim-	
14	8	39	24	26	2	1																		
16	8	39	24	25	2	2																		
18	1	8	39	25	2	2																		
20	1	8	38	26	21	3																		
22	1	9	38	27	19	3																		
24	10	39	27	18	3	3																		
26	10	40	26	18	3	3																		
28	10	41	25	18	3	3																		
30																								
32																								
34																								
36																								

Tree DBH Class	White Oak - Grade 3 Logs						Select Logs						Yellow-poplar											
	F&S	Sel.	1C	2C	3AC	3BC	Sound	Trim-	F&S	Sel.	1C	2C	3AC	3BC	Tim-	F&S	Sel.	1C	2C	3AC	3BC	Grade 1 Logs		
14	2	23	19	25	15	16																		
16	3	23	18	25	15	16																		
18	6	23	17	24	15	14																		
20	1	8	23	16	23	15																		
22	10	22	14	23	15	13																		
24	11	21	15	22	15	13																		
26	13	20	16	22	14	12																		
28	13	20	16	22	14	12																		
30	14	19	16	22	14	12																		
32	14	20	16	22	14	11																		
34	14	21	16	21	14	11																		
36																								
38																								
40																								
42																								
44																								
46																								
48																								

Table 3 (Continued).--Percentage of lumber in different lumber grades by species, log grade, and tree diameter class

Tree DBH Class	Yellow-poplar				Yellow-poplar			
	F&S	Sap	Grade 2 Logs	Grade 3 Logs	Sap	1C	2C	3AC
14					14	14	12	10
16					16	14	12	10
18					18	14	11	10
20					20	15	10	10
22					22	15	10	10
24					24	14	10	10
26					26	14	10	9
28					28	14	9	9
30					30	14	9	9
32					32	14	8	9
34					34	14	8	9
36					36	14	8	9
38					38	14	8	9
40					40	14	7	9

Lumber Thickness

Lumber thickness was determined as a phase of the lumber grade-yield study. Average thicknesses were calculated for each species and lumber grade. Ideally, the calculation should have been made by log sizes also, but this is a refinement which could have been justified only if the log samples had been much larger. Furthermore, the relationship between thickness and size is incidental; it is a consequence of the fact that thicknesses are related to grade yield, while grade yield is related to log size.

Table 4 presents average lumber thickness for each species and lumber grade.

Overrun and Underrun

The mill lumber tally of each log was compared with gross log scale, measured by the Scribner Decimal C log rule, and the difference expressed as a percentage of gross log scale. Using gross log scale as a basis did not eliminate entirely the effect of log defects on mill tally, but inasmuch as log defect is so variable, it was felt that a standardized basis for the expression of overrun and underrun would be preferable.

Curves of overrun and underrun by diameters were constructed for different species and log grades. The large samples were used to determine the general pattern of curves in regard to slope, location, and spacing. Since the pattern was regular, it was possible to locate curves for smaller log samples with some confidence in their reliability.

Table 5 lists the percentage overrun or underrun by log diameter classes for various species and log grades. Table 6 is similar except that percentages apply to tree diameter classes instead of log diameter classes.

Overrun goes up very rapidly when log diameter drops below 14 inches. This appears to be a consequence of the Scribner Decimal C log rule. With increasing diameter, however, overrun changes to underrun. In most species, the break-even point is below 28 inches. As between log grades, considerable differences in overrun appear. The reason is that the better log grades have less defect and the better lumber grades obtained from the logs are sawn into thicker dimensions. The sawing of timbers has the same effect. Chestnut is a special case in that log surface, on which log grade is based, did not indicate thoroughly the soundness of the lumber content; no significant difference in overrun from the various chestnut log grades could be discerned. For all species combined, the average overrun of mill lumber tally over gross log scale was 1.6 percent.

Table 4.--Percentage of lumber tallied in different thicknesses by species and lumber grade

Species	F & S						Select						
	4/4	5/4	6/4	8/4	9/4	10/4	ALL Thickness	4/4	5/4	6/4	8/4	9/4	10/4
Ash	15	6					100	22					
Basswood	15	100					100	24					
Beech		100					100						
Black Birch		100					100	28					
Buckeye		100					100	100					
Black Cherry													
Chestnut													
Cucumber													
Black Gum													
Hickory													
Sugar maple													
Red maple	11	69											
Black oak	37						63						
Chestnut oak							100	100	23	13			
Northern red oak	8						69		100	42			
Scarlet oak									100	18	17	6	
White oak	20						80		100	20	15	65	
Yellow-poplar							100	100	100	10	90	94	

Table 4 (Continued).--Percentage of lumber tallied in different thicknesses by species and lumber grade

Species	No. 1 Common						No. 2 Common						All Thicknesses
	4/4	5/4	6/4	8/4	9/4	10/4	All Thicknesses	4/4	5/4	6/4	8/4	9/4	
Ash	32			68			100	81			19	29	100
Basswood	36	8	92		2	62	100	71					100
Beech							100	26	74				100
Black Birch	22		78				100	39	61				100
Buckeye	100						100	100					100
Black Cherry	100						100	100					100
Chestnut								75					100
Cucumber	22						100	64					100
Black Gum	22						100	37					100
Hickory	33						100	23					100
Sugar Maple	10	52	2	6	2	28	100	24					100
Red Maple	8	66		10	16		100	33	74				100
Black Oak	74	2		24			100	88	49				100
Chestnut Oak	35	1		64			100	82	7				100
Northern Red Oak	56	17		27			100	81	8				100
Scarlet Oak	77	23					100	95	5				100
White Oak	42						100	86					100
Yellow-poplar	21						100	25					100
							79						

Table 4 (Continued).--Percentage of lumber tallied in different thicknesses by species and lumber grade

Species	No. 3A Common				No. 3B Common				Sound Worthy				All Thicknesses
	4/4	5/4	6/4	8/4	All Thicknesses	4/4	5/4	8/4	All Thicknesses	4/4	5/4	6/4	8/4
Ash	100				100				100				100
Basswood	100	40			100	100			100	100			100
Beech	60				100	73	27		100	100			100
Black Birch	83	17			100	100			100	100			100
Buckeyes	100				100	100			100	100			100
Black Cherry	100				100	100			100	100			100
Chestnut	95		5		100	100			100	100			100
Cucumber	91	4			100	100			100	100			100
Black Gum	79	2			19	100			100	100			100
Hickory	13				87	100	37		63	100			100
Sugar Maple	66	34			100	81			19	100			100
Red Maple	64	36			100	86			14	100			100
Black Oak	94				6	100	97		20	100	63		100
Chestnut Oak	85				15	100	80		100	100	100		100
N. Red Oak	81				19	100			100	100	100		100
Scarlet Oak	93				7	100			100	100	100		100
White Oak	95	3			2	100	94		6	100	88		12
Yellow-poplar	97	3			100	100			100	100	100		100

Table 4 (Continued).--Percentage of lumber tallied in different thicknesses by species and lumber grades

Species	Timbers					All Lumber Grades					All Dimensions	
	2x4	2x6	6x6	6x8	All Dimensions	4/4	5/4	6/4	8/4	9/4	10/4	
Ash						55	1		44	0.5	46	0.5
Basswood						51						100
Beech						32	66					100
Black Birch						47	53					100
Buckeye						100						100
Black Cherry						100						100
Chestnut	13	60	16	11	100	39	14					100
Cucumber						43	2					100
Black Gum		100			100	43						100
Hickory	1	75		24		16						100
Sugar Maple						28	47	1	3	1	20	100
Red Maple						30	54		11			100
Black Oak	100				100	85	4		10			100
Chestnut Oak		100			100	65			30			100
Northern Red Oak		58	42		100	52	12	1	29	5	6	100
Scarlet Oak		100			100	90	1		3	6	6	100
White Oak	4	85		11	100	67			23	10	10	100
Yellow-poplar									73			100

Table 5.-Percentage overrun or underrun by log diameter class for various species and log grades^{1/}

Log Diameter Class	Ash			Basswood			Beech			Black Birch			Buckeye		
	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	No. 3 Logs	No. 2 Logs	No. 3 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs			
10	22			31.5	25.5	21.5	25	17	15	24	35	17	15.5	18	9.5
12	16	11		21.5	15	8	15	8	8	11.5	6	20	9	9	3.5
14	8	3	-3	13	7.5	1	7	1.5	1	2.5	3	-2	14	4	-1.5
16	1.5			13	1.5	-4.5	1.5	-4.5	-4.5	-2.5	-3	-8	9	0	-5
18	-4	-8	-8	7	-3.5	-9	-3.5	-9	-9	-6	-8.5	-13	6	-3.5	-8
20	-8	-12	-12	2	-2	-7	-2	-7	-12	-9	-12	-16	3	-6.5	-11
22	-11	-15	-15	-2	-4	-7	-4	-7	-14.5	-12	-15	-19	3	-8	-13
24	-13.5	-17.5	-17.5	-4	-9	-11	-4	-9	-14.5	-11	-12.5	-19	0.5	-10	-14.5
26	-15.5	-19	-19	-6	-11	-17	-6	-11	-19	-12.5	-19	-19	-1.5	-10	-14.5
28	-17	-20	-20	-8.5	-12.5	-19	-8.5	-12.5	-19	-12.5	-19	-19	-3	-11.5	-16
30															
32															
34															
36															
38															
40															

^{1/}Difference between mill lumber tally and gross log scale, measured by the Scribner Decimal C log rule, expressed as a percentage.

Table 5 (Continued).--Percentage overrun or underrun by $\frac{1}{10}$ g diameter class for various species and log grades

Log Diameter Class	Bl. Cherry No. 2 Logs	Chestnut All Log Grades	Cucumber			No. 3 Logs	No. 1 Logs	Black Gum Logs	No. 2 Logs	No. 3 Logs	No. 1 Logs	No. 2 Logs	No. 3 Logs
			No. 1 Logs	No. 2 Logs	No. 3 Logs								
10	2	23.5				31	18	13	7.5	17	22	19	6.5
12	-3.5	16	28	20	8	12	7	2.5	-2	20.5	17	14	
14	-6	5.5	18	10.5	0	7.5	4	-1	-6	16	13	10	
16	-9.5	1.5	10	3.5	-7	4	-1	-4	-9	13	9.5	7	
18	-12	-2	3.5	-3	-13	1	-4	-6.5	-11	10	6.5	4	
20	-14	-5	-2	-8	-17	-2.5	-6.5	-8	-13	7	4	1.5	
22	-16	-7.5	-6.5	-11.5	-20.5	-3.5	-3.5	-8	-13	5	2	-0.5	
24	-18.5	-10.5	-10	-14.5	-23	-5	-5	-10	-15	3	0	-2.5	
26	-21	-13								1	-2	-4.5	
28													
30													
32													
34													
36													
38													
40													

$\frac{1}{10}$ / Difference between mill lumber tally and gross log scale, measured by the Scribner Decimal C log rule, expressed as a percentage of gross log scale.

Table 5 (Continued).--Percentage overrun or underrun by log diameter class for various species and log grades

Log Diameter Class	Red Maple			Sugar Maple			Black Oak			Chestnut Oak		
	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs
10	10			28			26			14.5		
12	8	4		26	15		16			9		
14	16	4	0	31	15	6	5.5	1		4		
16	11	0	-4	21	7	-1.5	-1	-6		0		
18	7.5	-3	-7	14.5	0.5	-7	-0.5	-6		-3.5		
20	4.5	-6	-10	9	-4	-11	-5	-10		-6.5		
22	2	-8	-12	5	-8	-14.5	-8.5	-14		-9		
24	0	-10	-14	1.5	-10.5	-17	-11.5	-13		-4.5		
26	-2	-11.5	-15.5	-1.5	-13	-19.5	-11.5	-15		-7		
28	-3.5	-12.5	-16.5	-3	-14	-21	-13	-16.5		-8.5		
30	-4.5	-13.5	-17.5				-13	-19.5		-13		
32	-5.5	-14.5	-18.5				-14	-18		-10		
34							-15.5	-21.5		-15		
36							-17					
38												
40												

^{1/} Difference between mill lumber tally and gross log scale, measured by the Scribner Decimal C log rule, expressed as a percentage of gross log scale.

Table 5 (Continued).--Percentage overrun or underrun by log diameter class for various species and log grades^{1/}

Log Diameter Class	Northern Red Oak			Scarlet Oak			White Oak			Yellow-Poplar		
	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	No. 2 Logs	No. 3 Logs	No. 1 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs
10												
12												
14												
16												
18												
20												
22												
24												
26												
28												
30												
32												
34												
36												
38												
40												
42												
44												

^{1/}Difference between mill lumber tally and gross log scale, measured by the Scribner Decimal C log rule, expressed as a percentage of gross log scale.

Table 6.—Percentage overrun or underrun by tree diameter class for various species and log grade^a/

Tree DBH Class	Ash			Basswood			Beech			Black Birch			Buckeye		
	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	No. 2 Logs	No. 3 Logs	No. 2 Logs	No. 3 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	
14	17	16	20.5	25	24	19.5	22	18.5	15	18	17	21	16	12	12
16	12	10.5	17	19	17	15	15	11	8	10.5	17.5	9	8	4.5	4.5
18	8	6	20.5	14	15	12	12	12	5	8.5	5.5	15	12	3	1.5
20	4.5	2	17	12	8	7	9.5	5	4.5	0.5	12	3	-1	-1	-1
22	2	-1.5	12	10	8	3	7	2	1	-1.5	-7	9.5	1	-3.5	-3.5
24	-1	-5	10	5	5	-1	-5	4.5	-2	-7	-7	7.5	-1	-6	-6
26	-3.5	-8.5	8	2	2	-5	-8.5	2	-1	-5	-5	5.5	-1	-8	-8
28	-6	-12	6	-1	-1	-5	-12	-3.5	-3.5	-6	4	2	-5	-9.5	-9.5
30	-8.5	-15.5	4.5	-3	-3	-12	-15.5	0	-6	-11	4	2	-7	-11	-11
32	-11	-19	3												
Tree DBH Class	Black Cherry			Cucumber			Black Gum			Hickory			Red Maple		
	No. 2 Logs	All Log Grades	No. 1 Logs	No. 2 Logs	No. 3 Logs	No. 1 Logs	No. 2 Logs	No. 3 Logs	No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	
14	3	22.5	30	23.5	23.5	13.5	12	10	8	22	21	17.5	17	7	8
16	0	18	28	24	17	12	10	6.5	4	19.5	15	14	4	3	3
18	-2	14	23	19	11	9.5	7.5	4	1	17	14	12.5	11.5	0	0
20	-4	9	18	15	6	6	6	2	-2	14.5	12	10	9	-1	-2
22	-6	5.5	14.5	11.5	1.5	1.5	0.5	0	-4	13	10	8	7.5	-2	-6
24	-7.5	3	11.5	7	-3	-3	-6.5	3	-2	11	8	6	6	-4	-6.5
26	-9	0	8.5	3	4.5	4.5	-6.5	2	-4	9.5	6.5	5	4.5	-5	-6.5
28	-10.5	-2	6	0	-10.5	-10.5	2	-4	-9	9.5	5	3	3	-7.5	-10
30	-12	-4	3	-3.5	-14	1	-6	-11	7	3.5	1.5	2	2	-7.5	-11
32	-13	-6													
34	-13	-7.5													
36	-9	-9													
38	-10.5	-10.5													
40	-12	-12													
42		-13.5													

^a/ Difference between mill lumber tally and gross log scale, measured by the Scribner Decimal C log rule, expressed as a percentage of gross log scale.

Table 6 (Continued).--Percentage overrun or underrun by tree diameter class for various species and log grades¹

Tree DBH Class	Sugar Maple			Black Oak			Chestnut Oak			N. Red Oak		
	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs
14	26	19		15	14		17	13	11.5	18	14	13.5
16	29	21	13	12	10	7.5	17	13	6.5	26	14	9.5
18	25	16	8	8	5	3	14	9	2	22.5	10.5	6
20	21.5	12.5	4	4	1.5	-1	11	6	-1	20	8	3
22	17	9	0.5	1.5	-2	-5	9	3	-4	17.5	5	0.5
24	15	6	-3	-0.5	-4.5	-8	7	1	-7	15	3	-1.5
26	13	3	-6	-2.5	-7	-10	5	-1	-9	13.5	1.5	-3
28	11	0.5	-8.5	-4	-9	-12	4	-3	-11	12	0	-4.5
30	8.5	-2	-11.5	-6	-10.5	-14	2	-4.5	-13	10	-1.5	-6
32	6.5			-7	-12	-16	1	-6	-15	8.5	-3	-7.5
34				-8.5	-10		0	-1		7	-4	-9
36										6	-5.5	
38										3	4.5	
40										1.5		
42										0		
44												

¹/ Difference between mill lumber tally, and gross log scale, measured by the Scribner Decimal C Log rule, expressed as a percentage of gross log scale.

Table 6 (Continued).--Percentage overrun or underrun¹ by tree diameter class for various species and log grades.

Tree DBH Class	Scarlet Oak			White Oak			Select & No. 1 Logs			Yellow-poplar		
	No. 2 Logs	No. 3 Logs	Select & No. 1 Logs	No. 2 Logs	No. 3 Logs	No. 3 Logs	No. 2 Logs	No. 2 Logs	No. 2 Logs	No. 2 Logs	No. 2 Logs	No. 3 Logs
14	19.5	15		26	22.5		22.5	29.5		32.5		28
16	14	8.5	25	19	15		15	26		26		22
18	9	3.5	20	13.5	9		9	24		21		17
20	5.5	0	16	8.5	4		4	20		17		12.5
22	2.5	-3.5	12.5	4.5	0		0	16.5		13		9
24	0	-6	9.5	1	-3.5		-3.5	13.5		10		6
26	-1.5	-8	7	-2	-7		-7	11		7.5		3.5
28	-3.5	-10	5	-5	-9.5		-9.5	9		5.5		1
30	-5		3	-7	-12		-12	7		3.5		-1
32	-6		1.5	-8.5	-13.5		-13.5	5		1.5		-3
34			0	-10.5	-15		-15	3		0		-5
36								1.5		-1.5		-6.5
38								0		-3.5		-5
40								-1		-1		-2.5
42								-4		-4		
44								-6		-6		
46								-8		-8		
48												

¹/Difference between mill lumber tally and gross log scale, measured by the Scribner Decimal log rule, expressed as a percentage of gross log scale.

Lumber Value Yields

The prices used as a basis for the calculation of value yields for green lumber were the OPA ceilings in force on May 7, 1946.^{5/} The first calculation was to weight ceiling prices for various thicknesses, species, and lumber grades by the percentage of lumber occurring in each thickness (table 7). Next, the prices in table 7 were weighted with the grade-yield percentages from tables 2 and 3; and new tables were constructed showing the average value per M bd. ft. for each species and log diameter class (table 8) and the average value per M bd. ft. for each species and tree diameter class (table 9).

The values shown in tables 8 and 9 have not been adjusted on curves to regularize the value differences between diameter classes. Nevertheless, the values do show a definite trend of increase with increase in diameter. This is true both for log diameter and tree diameter classes.

That there is a real advantage in distinguishing between log grades becomes readily apparent in tables 8 and 9. In most cases, the differences in value yields between the several log grades for a particular species are quite substantial. It is interesting to note, too, that the log grading rules used have resulted in a regular spacing of lumber value yields between log grades. There are only a few exceptions, such as black gum and hickory, to the pattern of substantial differences in value between log grades, but it is doubtful that any improvement in this respect would result from changing the log grading rules. Select logs were numerous enough in this study to warrant separation from No. 1 logs for only three species — chestnut oak, northern red oak, and yellow poplar — and in the case of the first two species, the separation was well justified.

A final calculation was made to reduce the lumber values in tables 8 and 9, which were on a mill tally basis, to a gross log scale basis (tables 10 and 11).^{6/} It will be noted in tables 10 and 11 that the trend of value yields is to decrease as diameter increases. This need not be confusing since the comparisons are on a log scale basis, not mill tally, while overrun diminishes or underrun increases as log and tree diameters increase.

^{5/} Green lumber price ceilings were determined, according to OPA regulations, by reducing the air-dry ceiling prices 10 percent.

^{6/} Tables 5 and 6, presenting percentage overrun or underrun of lumber mill tally over gross log scale, provided the basis for converting values from a mill tally basis to a gross log volume basis. In the case of overrun, the mill tally value per M bd. ft. was divided by $1 + p$ where p was the percentage of overrun. In the case of underrun, the mill tally value per M bd. ft. was divided by $1 + p$.

Table 7.-Average ceiling prices of green lumber per M bd. ft., mill tally, by species and lumber grade^{1/}

Species	Lumber Grade								Timbers
	F & S	Select	No. 1C	No. 2C	No. 3AC	No. 3BC	No. 3C2/	Sound Wormy	
Ash	\$ 92.09	\$ 66.75	\$ 64.77	\$ 40.14					\$ 25.65
Basswood	97.04	71.57	69.76	44.71					25.65
Beech	74.25	55.28	55.28	40.03	\$ 30.96	\$ 20.70			
Black Birch	117.00	72.11	72.11	47.73	30.76	24.28			\$ 47.75
Buckeye	66.15	46.35	46.35	36.45					25.65
Black Cherry		74.25	74.25	48.60					28.80
Chestnut				30.60					24.77
Cucumber	107.73	73.60	71.38	47.11					48.78
Black Gum		51.05	51.05	36.87					24.77
Hickory				52.99	37.53				28.52
Red Maple	91.70	68.58	68.58	44.24					
Sugar Maple	128.27	87.41	79.48	43.88					
Black Oak	94.97	66.91	63.23	43.43					
Chestnut Oak	130.50	70.97	70.97	44.54					
N. Red Oak	97.57	66.92	64.07	44.06					
Scarlet Oak		67.07	62.13	42.88					
White Oak	126.81	74.08	70.62	44.14					
Yellow-poplar	109.80	2/88.21	71.51	49.39					
									25.67

^{1/}Green lumber prices based on OPA ceiling prices of May 7, 1946. The price for each thickness was weighted by the percentage of lumber in each thickness.

^{2/}Prices for No. 3 Common are given where No. 3A Common and 3B Common are not differentiated.

^{2/}This price is for sap yellow-poplar rather than select.

Table 8.--Value yields per M bd. ft. of green lumber, mill tally, by species, log grades, and log diameter classes.

Log Diameter Class	Ash	Basswood			Beech			Black Birch			Buckeye			Black Cherry			
		All Log Grades	Select & Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 2 Logs	Grade 2 Logs	Grade 2 Logs	Grade 2 Logs	Grade 2 Logs	Grade 2 Logs	
		All Log Grades	Log Grades	Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades							
10	\$40.81																
12	49.15	\$54.13	\$64.05	\$64.05	\$48.13	\$48.86	\$48.86	\$48.86	\$48.86	\$48.86	\$32.04	\$32.04	\$32.04	\$32.04	\$32.04	\$32.04	
14	50.73	56.16	68.13	68.13	50.71	50.71	50.71	50.71	50.71	50.71	54.10	54.10	54.10	54.10	54.10	54.10	
16	51.45	56.16	68.13	68.13	52.26	52.26	52.26	52.26	52.26	52.26	56.52	56.52	56.52	56.52	56.52	56.52	
18	52.26	56.16	70.02	70.02	52.82	52.82	52.82	52.82	52.82	52.82	58.30	58.30	58.30	58.30	58.30	58.30	
20	52.82	56.17	70.54	70.54	53.61	53.61	53.61	53.61	53.61	53.61	59.64	59.64	59.64	59.64	59.64	59.64	
22	53.61	71.07	71.07	71.07	53.88	53.88	53.88	53.88	53.88	53.88	60.98	60.98	60.98	60.98	60.98	60.98	
24	53.88	71.61	71.61	71.61	54.54	54.54	54.54	54.54	54.54	54.54	62.32	62.32	62.32	62.32	62.32	62.32	
26	54.54	71.70	71.70	71.70	55.62	55.62	55.62	55.62	55.62	55.62	58.95	58.95	58.95	58.95	58.95	58.95	
28	55.62	72.22	72.22	72.22							54.18	54.18	54.18	54.18	54.18	54.18	
30																	
32																	
34																	
36																	
38																	
Log Diameter Class	Cucumber	Black Gum			Hickory			Red Maple			Sassafras			Sassafras			
		Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Select & Grade 2 Logs	Select & Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	
		All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	All Log Grades	
10																	
12		\$51.46	42.62	\$40.49	\$36.21	\$36.21	\$36.21	\$34.86	\$39.34	\$37.58	\$37.58	\$38.07	\$37.79	\$37.79	\$37.79	\$37.79	\$37.79
14		\$58.69	51.92	43.55	\$41.04	38.42	36.34	35.34	39.94	38.32	38.32	38.32	38.32	38.32	38.32	38.32	38.32
16		60.32	51.92	44.02	41.89	39.24	37.28	37.28	40.07	38.61	38.61	38.61	38.61	38.61	38.61	38.61	38.61
18		62.65	51.92	44.26	42.73	39.49	37.66	37.66	40.33	38.78	38.78	38.78	38.78	38.78	38.78	38.78	38.78
20		64.35	52.38	44.47	43.28	39.65	38.06	38.06	40.37	38.78	38.78	38.78	38.78	38.78	38.78	38.78	38.78
22		64.83	52.59	44.68	43.56	39.81	38.22	38.22	40.64	39.08	39.08	39.08	39.08	39.08	39.08	39.08	39.08
24		65.09	52.59	44.89	43.84	40.09	38.37	38.37	40.93	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37
26		65.37	52.80	45.10	44.13	40.28	38.39	38.39	40.96	39.53	39.53	39.53	39.53	39.53	39.53	39.53	39.53
28									41.00	39.67	39.67	39.67	39.67	39.67	39.67	39.67	39.67
30																70.01	56.42
32																	70.62

Table 8 (Continued).--Value yields per M bd. ft. of green lumber, mill tally, by species, log grade, and log diameter class

Loc Diam. Class	Sugar Maple			Black Oak			Chestnut Oak			Northern Red Oak		
	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs
10	\$45.50			\$32.64			\$37.04			\$45.29		
12	\$53.36	48.91		\$37.81	35.94		\$41.56	37.44		\$58.30	47.16	
14	\$61.52	59.54	51.97	\$44.50	39.83	31.32	\$41.50	41.02	38.27	\$59.22	47.25	
16	\$62.82	63.80	53.84	\$48.83	41.94	38.82	\$53.02	46.27	41.02	\$64.00	50.71	
18	\$64.61	67.39	55.56	\$53.00	41.94	38.82	\$54.59	47.14	42.86	\$65.24	60.95	
20	\$66.02	69.03	56.05	\$56.08	42.58	39.57	\$56.16	47.77	43.91	\$66.75	61.95	
22	\$66.87	70.41	56.49	\$58.08	43.50	39.71	\$57.95	48.69	44.71	\$68.53	63.21	
24	\$67.72	71.69	56.84	\$59.15	44.06	39.95	\$59.51	49.70	45.73	\$69.88	64.42	
26	\$68.74	72.80	57.83	\$59.63	44.63	40.76	\$60.99	50.05	46.24	\$70.88	65.45	
28	\$69.55	74.38	58.34	\$60.10	45.09	41.36	\$62.15	52.04	46.98	\$72.16	66.68	
30							\$64.21	53.15		\$73.34	68.00	
32							\$60.86			\$74.64	68.87	
34							\$61.75			\$75.65	69.08	
36										\$76.68	70.71	
38										\$77.45	71.79	
40										\$77.45		

Table 8 (Continued).--Value yields per M bd. ft. of green lumber, mill tally, by species, log grade, and log diameter class

Log Diameter Class	N. Red Oak	Scarlet Oak			White Oak			Yellow-poplar			
		Grade 3 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs
10	\$45.01			\$34.97			\$34.39				\$46.93
12	46.06	\$37.83	35.94		\$47.42	35.86					47.15
14	46.20	40.98	37.26		\$53.43	49.29	37.83				47.15
16	46.78	43.75	37.32		57.36	50.88	38.82	\$70.01	67.03		53.99
18	47.15	45.68	37.42		61.11	52.56	39.93	70.01	67.40		54.37
20	47.74	47.11	37.86		64.54	54.43	41.08	70.85	67.40		54.79
22	47.78	47.54	38.48		67.14	56.05	41.91	71.45	68.63		55.40
24	48.69	47.78	38.52		69.64	56.32	42.17	71.45	69.03		55.83
26	48.93	48.10			70.98	57.28	42.34	71.45	69.49		56.04
28	49.66	48.51			72.10	58.61	42.34	72.29	69.49		56.64
30	50.67				74.44	60.05	42.63				49.82
32								72.89	70.48		57.66
34								74.93	70.48		57.87
36								75.77	71.10		58.09
38										76.36	
40										77.82	
42										78.42	
44											79.03

Table 9.-Value yields per M bd. ft. of green lumber, mill tally, by species, log grade¹, and tree diameter class

Tree DBH Class	Ash All Log Grades	Basswood			Beech			Black Birch			Buckeye			Black Cherry			Chestnut		
		Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 3 Logs	Grade 2 Logs	Grade 3 Logs	Grade 3 Logs	Grade 2 Logs	Grade 3 Logs	Grade 2 Logs								
14	\$49.14			\$45.34	\$39.53	40.01	\$32.47												
16	49.68			\$55.13	46.75	40.61	33.35												
18	50.64			\$66.45	55.43	47.87	33.97												
20	51.19			67.61	56.15	49.27	34.37												
22	51.73			68.59	56.43	51.12	42.62												
24	52.28			69.31	56.94	51.81	43.48												
26	52.82			70.02	57.66	52.05	44.54												
28	53.37			70.73	58.38	52.77	45.41												
30	54.27			71.25	59.39	53.21	45.60												
32	54.94			71.79	60.37	53.68													
34	36																		
36	38																		
40																			
42																			

Tree DBH Class	Cucumber			Black Gum			Grade 3			Grade 2			Hickory			Red Maple		
	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Logs	Logs	Logs	Logs	Logs	Logs	Logs	Logs	Logs	Logs	Logs	
14				\$41.91			\$34.44			\$37.43								
16		\$51.46	42.62		\$38.51	35.12	\$39.67			37.75								
18	\$59.55	51.92	43.09	\$41.65	38.62	36.05	\$39.85			36.03			\$63.50		\$51.42			
20	59.92	51.92	43.34	42.03	39.02	36.74	39.99			38.18			65.21		51.99			
22	60.92	51.92	43.58	42.17	39.27	37.26	40.25			38.47			66.05		52.82			
24	62.65	52.38	43.58	42.58	39.55	37.52	40.41			38.65			67.29		53.40			
26	64.28	52.59	44.04	43.15	39.83	38.07	40.37			38.85			67.91		54.01			
28	65.47	52.80	44.26	43.42	39.97	38.09	40.78			39.25			68.52		54.52			
30	65.61	53.01	44.92	43.84	40.36	38.50	40.91			39.44			69.14		55.16			
32													41.04		69.76			
34															70.62			
36															71.10			

1/ Values for a particular log grade and species are based on the assumption that all logs cut from a tree are of the same grade.

Table 9 (Continued).--Value yields per M bd. ft. of green lumber, mill tally, by species, log grade¹, and tree diameter class

Tree DBH Class	Sugar Maple			Black Oak			Chestnut Oak			N. Red Oak		
	Select & Grade Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs
14	\$55.90	48.89	\$48.18	\$35.42	\$35.42	\$35.42	\$41.53	\$37.45	\$37.76	\$37.76	\$41.53	\$37.45
16	59.05	51.54	48.99	39.88	36.81	35.68	41.53	38.03	38.03	38.03	41.53	38.03
18	\$82.91	62.25	53.94	49.23	40.19	37.26	\$45.35	46.27	41.85	38.49	41.85	38.49
20	83.61	66.42	54.20	50.99	41.50	38.51	\$54.26	47.19	42.36	39.22	42.36	39.22
22	84.63	67.39	54.58	53.23	42.37	38.57	54.59	47.43	43.36	39.54	43.36	39.54
24	85.45	68.37	55.56	54.40	43.02	39.76	55.83	47.43	43.36	39.54	43.36	39.54
26	86.42	70.06	56.13	55.23	44.14	40.09	56.61	49.18	43.91	39.62	43.91	39.62
28	87.40	71.03	57.69	56.83	44.40	41.21	56.93	50.10	44.42	39.71	44.42	39.71
30	88.83	71.80	59.80	57.67	44.52	41.53	58.55	50.33	44.91	40.35	44.91	40.35
32	89.80	58.35	59.32	58.35	44.52	41.53	59.04	50.57	45.41	40.43	45.41	40.43
34	36	38	40	42	44	41	61.61	51.78	52.18	52.18	52.18	52.18

¹/Values for a particular log grade and species are based on the assumption that all logs cut from a tree are of the same grade.

Table 9 (Continued). -Value yields per M bd. ft. of green lumber, mill tally, by species, log grade¹, and tree diameter class

Tree DBH Class	N. Red Oak (Cont'd)				Scarlet Oak				White Oak				Yellow-poplar			
	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Logs	Grade 2 Logs	Grade 3 Logs	Logs	Grade 2 Logs	Grade 3 Logs	Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Logs	Grade 1 Logs	
14	\$46.06	\$46.06	\$46.06	\$46.06	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66	\$35.66
16	\$47.10	\$47.10	\$47.10	\$47.10	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71	\$39.71
18	\$58.88	\$47.60	\$45.86	\$47.32	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41	\$41.41
20	\$59.52	\$48.49	\$45.49	\$47.34	\$47.34	\$44.04	\$44.04	\$44.04	\$44.04	\$44.04	\$44.04	\$44.04	\$44.04	\$44.04	\$44.04	\$44.04
22	\$60.61	\$49.84	\$49.84	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92	\$47.92
24	\$61.29	\$50.64	\$50.64	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50	\$49.50
26	\$61.62	\$51.02	\$51.02	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49	\$49.49
28	\$62.20	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00	\$52.00
30	\$63.22	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80	\$53.80
32	\$63.89	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47	\$54.47
34	\$64.22	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14	\$55.14
36	\$65.09	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05	\$56.05
38	\$65.79	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71	\$56.71
40	\$66.12	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00	\$67.00
42	\$67.00															
44																
46																
48																

¹/ Values for a particular log grade and species are based on the assumption that all logs cut from a tree are of the same grade.

Table 10.--Value yields per M bd. ft. of green lumber, log scale basis, by species, log grade, and log diameter class

Log Diameter Class	Ash All Log Grades	Basswood			Beech			Black Birch			Buckeye			Black Cherry			Chestnut
		Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	All Log Grades
10	\$65.08				\$62.88	\$51.49	\$48.23							\$43.74	\$48.16		
12	58.51				\$72.17	\$68.29	\$63.79							\$49.43	\$46.47		
14	55.14				\$66.04	\$53.11	\$45.30	61.13	36.70	34.39	41.30	39.58					
16	52.23				78.31	60.71	51.22	43.41	58.27	34.39	49.58						
18	50.25				75.29	57.02	49.61	42.64	56.60	32.57	49.07	38.10					
20	48.91				71.98	54.27	48.20	42.01	54.97	31.28	49.30	37.22					
22	48.30				69.68	52.92	47.54	41.56	54.45	31.04	49.12	36.36					
24	47.47				68.86	52.60	46.89	40.99	54.19	30.66	48.89	36.06					
26	47.22				67.64	52.30	46.09	40.92			48.61	35.49					
28	47.54				66.56	52.01	45.53				48.19	35.20					
30																	
32																	
34																	
36																	
38																	

Log Diameter Class	Cucumber			Black Gum			Hickory			Red Maple			Grade 1 Logs			Grade 2 Logs	Grade 3 Logs
	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Logs	
10				\$58.68	\$39.81	\$39.81				\$51.01							\$48.03
12				\$74.58	\$51.98	\$45.92				\$50.44	46.40						\$45.49
14				64.90	47.34	41.39				48.00	44.03						\$45.49
16				58.01	44.02	40.25				46.06	42.52						\$43.01
18				53.80	41.36	44.51				44.08	41.52						\$42.58
20				66.58	50.85	39.35				43.18	40.40						\$41.49
22				63.56	48.69	38.19				42.33	39.68						\$40.46
24				61.12	47.17	37.25				41.77	39.17						\$39.52
26				59.42	46.11	36.67				40.96	38.57						\$39.52
28										40.20	37.96						\$39.43
30												67.00	67.00	67.00	66.94	66.94	
32																	

Table 10 (Continued).--Value yields per M bd. ft. of green lumber, log scale basis, by species, log grade, and log diameter class.

Log Diameter Class	Sugar Maple				Black Oak				Chestnut Oak				N. Red Oak		
	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	
10	\$63.19	\$44.11	\$44.11	\$45.01	39.93	39.93	\$48.56	41.14	\$43.32	\$43.32	\$48.56	41.14	\$48.70	\$48.70	
12	\$72.11	\$57.54	\$57.54	\$50.00	42.15	36.57	\$45.60	39.50	\$44.02	\$44.02	\$45.60	39.50	\$48.00	\$48.00	
14	\$118.14	70.05	55.23	\$53.04	50.86	40.91	\$59.58	51.99	\$44.02	\$44.02	\$48.57	38.57	\$74.02	\$74.02	
16	104.84	68.60	53.04	52.74	39.57	35.22	\$58.70	50.74	43.29	43.29	\$80.00	74.02	\$78.70	\$78.70	
18	98.96	67.73	51.93	50.50	53.41	38.71	58.20	49.50	43.05	43.05	\$80.47	71.70	76.87	71.70	
20	94.53	66.38	50.50	49.34	53.53	38.50	58.24	49.18	42.93	42.93	\$8.24	70.39	76.03	70.39	
22	91.44	65.19	49.34	49.06	53.05	38.31	58.09	34.09	34.09	34.09	\$8.50	69.46	75.31	69.46	
24	89.06	64.88	48.58	48.58	53.05	38.31	58.37	33.57	48.97	48.97	\$8.10	69.27	75.14	69.27	
26	87.43	64.42	48.39	48.39	52.77	38.31	58.23	33.83	48.36	48.36	\$7.71	68.87	74.61	68.87	
28	86.94	65.25	48.21	48.21	52.72	38.21	54.04	34.04	59.19	49.56	42.71	37.93	74.78	69.10	
30					52.69				60.01	49.67			75.73	69.74	
					52.78								75.98	69.92	
													75.65	69.88	
													75.92	70.01	
													75.93	69.99	
													75.19		

Table 10 (Continued).--Value yields per M bd. ft. of green lumber, log scale basis, by species, log grade, and log diameter class

Log Diameter Class	N. Red Oak (Cont)			Scarlet Oak			White Oak			Yellow-poplar		
	Grade 2 Logs	Grade 3 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Selent Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	
10	\$54.89	\$45.41	\$46.13	\$39.93	\$61.19	\$50.95	\$41.70	\$39.41	\$79.36	\$71.11	\$62.04	
12	\$55.43	\$51.46	\$45.03	\$38.02	\$70.77	\$55.07	\$52.45	\$38.06	\$94.41	\$68.01	\$54.83	
14	\$52.40	\$48.63	\$47.01	\$35.88	\$67.48	\$51.78	\$37.32	\$37.51	\$83.79	\$62.42	\$51.17	
16	\$52.12	\$47.04	\$47.04	\$34.65	\$66.42	\$51.59	\$37.01	\$77.92	\$59.10	\$48.92		
18	\$51.48	\$45.78	\$44.78	\$34.55	\$67.23	\$51.59	\$37.01	\$73.26	\$56.48			
20	\$51.71	\$45.04	\$44.65	\$33.80	\$67.82	\$51.90	\$36.76	\$74.04	\$71.12			
22	\$52.05	\$44.24	\$44.22	\$33.75	\$68.61	\$50.97	\$36.51	\$71.45	\$69.03			
24	\$52.14	\$44.26	\$43.83	\$33.49	\$68.91	\$51.14	\$36.19	\$70.05	\$68.13			
26	\$52.59	\$43.88	\$43.73	\$43.73	\$68.92	\$51.64	\$35.58	\$69.51	\$66.82			
28	\$53.30	\$44.14	\$43.70	\$43.70	\$68.92	\$52.22	\$35.38	\$69.42	\$66.18			
30	\$53.42	\$44.45										
32	\$53.51											
34	\$53.94											
36												
38												
40												
42												
44												

Table 11.—Value yields per M bd. ft. of green lumber, gross log scale, by species, log grade^{1/}, and tree diameter class

Tree DBH Class	Ash All Log Grades	Basswood			Beech Grade 3 Logs	Black Birch Grade 2 Logs	Buckeye Select & Grade 1 Logs	Grade 2 Logs	Black Cherry Grade 2 Logs	Chestnut All Log Grades
		Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs						
14	\$59.20		\$59.66	\$49.11		\$42.72				\$40.25
16	56.45	\$68.06	56.33	47.07	\$65.06	40.16				38.29
18	55.04	\$80.06	65.21	54.40	45.63	62.65	37.96	\$50.10	41.08	36.50
20	53.60	78.62	63.09	52.98	45.10	60.81	36.37	49.69	40.20	34.76
22	52.79	77.94	61.34	52.70	44.86	59.18	34.95	49.48	39.18	33.74
24	51.76	77.01	59.94	51.30	44.37	57.96	33.99	49.88	38.71	33.11
26	51.03	76.11	58.84	49.57	43.90	57.16	33.26	49.34	38.14	32.38
28	50.35	75.24	57.80	48.64	43.87	56.87	32.27	49.04	37.60	32.01
30	50.02	74.61	57.66	47.51	43.02			48.90	37.08	44.58
32	49.50	74.01	56.95	46.48				48.62	36.58	44.58
34										31.63
36										31.09
38										30.49
40										30.10
42										30.14
										30.19

^{1/} Values for a particular log grade and species are based on the assumption that all logs cut from a tree are of the same grade.

Table 11 (Continued).--Value yields per M bd. ft. of green lumber, gross log scale, by species, log grade^{1/}, and tree diameter class

Tree DBH Class	Cucumber			Black Gum			Hickory			Red Maple		
	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs
14			\$54.78			\$39.14			\$47.38			\$47.25
16		\$67.71	51.35		\$42.79	38.17		\$49.28	45.76			45.07
18	\$77.34	64.10	48.42	\$46.02	41.30	37.55	47.72	44.74				43.97
20	73.07	61.08	46.11	45.44	40.65	37.11	46.50	43.63				43.44
22	71.25	58.34	44.24	44.86	40.07	36.53	45.74	42.74				42.74
24	70.79	56.32	42.31	44.59	39.55	36.08	44.90	42.01				42.40
26	70.25	54.22	41.35	44.48	39.05	35.75	44.12	41.33				42.23
28	69.65	52.80	40.05	44.31	38.43	34.94	43.61	41.10				42.00
30	67.64	51.22	39.40	44.28	38.08	34.68	43.06	40.66				41.99
32								42.53	40.20			42.09
34										70.97	51.61	42.41
36										70.75	51.48	42.38

^{1/}Values for a particular log grade and species are based on the assumption that all logs cut from a tree are of the same grade.

Table 11 (Continued).--Value yields per M bd. ft. of green lumber, gross log scale, by species, log grade^{1/}, and tree diameter class

Tree DBH Class	Sugar Maple			Black Oak			Chestnut Oak			N. Red Oak		
	Select Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs
14	\$59.48				\$41.19						\$42.32	
16	\$70.76	56.20		\$43.43	38.57		\$47.74	40.39				\$75.97
18	\$110.55	70.30	56.02	\$53.25	41.98	37.95	\$52.73	45.64	44.52	38.11		
20	106.51	71.14	56.19	51.28	40.80	36.89	\$60.97	51.99	43.67	37.71	\$80.84	74.40
22	101.96	72.99	54.47	51.77	40.69	36.68	59.99	51.86	43.80	36.95	79.20	73.47
24	100.53	71.69	52.99	52.97	40.55	35.71	60.03	51.00	43.00	36.95	77.65	72.11
26	99.33	70.48	52.42	53.07	40.21	36.15	59.59	51.77	43.48	36.35	77.40	71.24
28	98.20	70.41	51.73	53.11	40.50	35.79	59.30	52.19	43.13	35.77	76.84	70.78
30	97.08	69.64	51.74	53.61	40.18	36.15	59.74	51.36	42.98	35.71	76.52	70.23
32	96.04			53.90	39.75	35.80	59.64	51.08	42.84	35.16	76.00	69.83
34				53.78			60.37	51.78			75.66	69.05
36				53.93			61.00	51.66			75.55	69.24
38											75.36	68.89
40											74.88	68.16
42											74.42	68.02
44											73.89	

^{1/}Values for a particular log grade and species are based on the assumption that all logs cut from a tree are of the same grade.

Table 11 (Continued).--Value yields per M bd. ft. of green lumber, gross log scale, by species, log grade^{1/}, and tree diameter class.

Tree DBH Class	N. Red Oak (Cont)			Scarlet Oak			White Oak			Yellow-poplar		
	Grade 2 Logs	Grade 3 Logs	Grade 2 Logs	Grade 3 Logs	Select & Grade 1 Logs	Grade 2 Logs	Grade 3 Logs	Select Logs	Grade 1 Logs	Grade 2 Logs	Grade Logs	Grade Logs
14	\$54.77	\$53.25	\$46.17	\$41.95	\$60.06	\$45.68	\$45.68	\$72.50	\$65.65	\$60.60	\$60.60	\$60.60
16	51.17	51.17	46.17	39.17	57.69	42.12	42.12	68.70	65.93	57.23	57.23	54.82
18	49.85	49.85	45.56	37.67	56.23	41.07	41.07	83.79	83.79	65.93	65.93	54.82
20	52.71	49.45	46.49	36.63	67.74	40.78	40.78	89.38	86.65	80.72	80.72	63.15
22	52.46	47.58	45.17	35.87	54.38	40.77	40.77	83.75	83.64	77.92	77.92	53.14
24	52.18	47.21	45.28	35.25	68.44	53.35	53.35	83.64	83.64	61.48	61.48	51.62
26	52.27	47.09	45.43	34.71	69.20	52.85	52.85	38.87	81.29	76.16	76.16	59.82
28	52.69	46.41	44.95	34.19	68.86	52.26	52.26	37.98	79.90	74.93	74.93	58.77
30	53.00	46.02	45.10	45.10	69.07	52.06	52.06	37.38	78.35	73.97	73.97	58.42
32	52.88	46.00	45.25	45.25	68.94	52.22	52.22	36.93	76.88	72.83	72.83	57.70
34	53.02	45.68	45.68	45.68	68.89	51.73	51.73	36.65	75.30	72.41	72.41	57.90
36	53.13				69.44				75.02	71.31	71.31	57.49
38	53.25								74.27	70.46	70.46	56.60
40									73.53	69.99	69.99	56.37
42									73.04			
44									72.21			
46									71.86			
48									71.31			

^{1/} Values for a particular log grade and species are based on the assumption that all logs cut from a tree are of the same grade.

